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(54) Title: MOBILE INFORMATION SERVICE
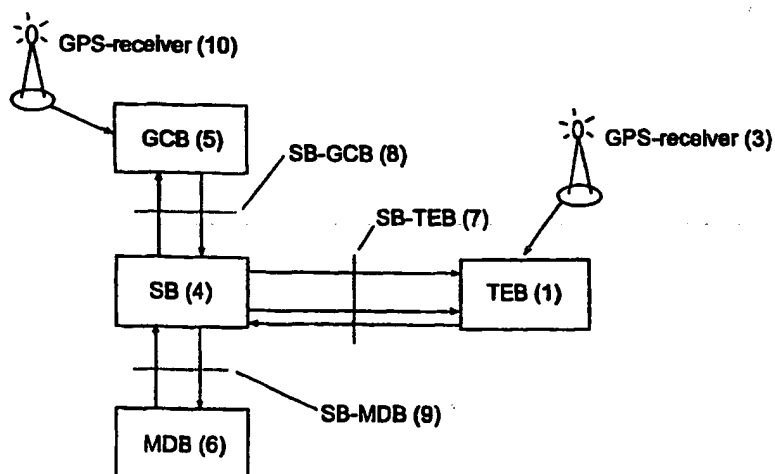
(57) Abstract

The invention describes a mobile information service that gives a user access to tailored and position adapted information. The information is adapted both to the user's position and according to special wishes regarding content of information. This is achieved by means of a www–technology, especially developed software for service logic, and software to distribute position information over Internet. The information is shown on one into two parts divided window on an ordinary portable computer, which is equipped with a GPS–receiver. The accuracy of the position information is improved by means of differential GPS, DGPS. One of the windows shows a map over the area where the user is. On the map are shown icons that indicate places of interest, cash dispensers, restaurants and traffic interchanges etc. If one clicks on one icon, there is in the other window shown information about the place, for instance menu for a near located restaurant. There also is possible to make personal adaptations, so that information is shown automatically when one is approaching a certain point. Warning information, such as traffic warnings, can automatically be shown when one is approaching an area.

MOBILE INFORMATION SERVICE

TECHNICAL FIELD

5

The in the present invention described personal information
service combines Internet technology, mobile communication,
and an ordinary portable computer, with a GPS-receiver to a
personal mobile information guide.

10

The information is shown on a window divided into two parts
on the screen of the computer. One of the windows shows a
map of the area where the user is. On the map are shown
icons, which indicate places of interest, cash dispensers,

15   restaurants, traffic interchanges etc. If one clicks on an
icon, there is in the other window shown information about
the place, for instance the menu of the day for a nearby
restaurant. There also will be possibilities to make
personal adaptations so that information is shown

20   automatically when one is approaching a certain point.

Warning information such as traffic warnings can
automatically be shown when one is approaching an area
where, for instance, the roads are in a bad state, or there

25   is a risk of game.

PRIOR ART

30   At a performed patent state investigation, the following
documents have been found:

D1.   US,A   5 802 492
D2.   US,A   5 559 520
35   D3.   JP,A   10-185599
D4.   JP,A   09-311177

It is well known to utilise systems for geographical positioning, in the first place by utilisation of GPS. Such systems are i.a. included in the inventions according to the above indicated documents.

From document D1 there is known a system for planning of a car journey by means of a computer. The user makes choice of roads in order to visit interesting places along the road. The map is loaded from a CD. During the journey the user can see his/her position on the map, which is shown on the screen, at which places of interest are marked on the map and information is given about these places. A variant of the invention describes that one via a wireless interface can update the map during the journey.

It is also known how geographical information is transmitted to mobile users via radio (Document D2), or via e-mail (Document D3).

Document D4 describes a system where one is using Internet to transmit correction data from reference stations in order to improve the accuracy at positioning by means of GPS.

TECHNICAL PROBLEM

At journeys, information about the position is needed. Such position information can be obtained in different ways with different manual of automatic methods. It is, however, difficult to, on demand, get information about where one is, and at the same time get the information shown on a map. By utilising modern communication methods one can, according to this invention, get such information also during the journey, for instance shown on a portable computer that one carries with one at a car journey.

It also can be difficult, with the available support
functions of today, to get sufficient accuracy of the
position indication. Today existing solutions are using
DGPS for correction of the position. To make these work,

5   however, is required that a special receiver for correction
data is utilised. The in the present invention described
method can give a position indication with an error of less
than 20 m.

10 To reach the destination of the journey, the user also need
guiding about the further route. How to go to reach the
destination can be uncertain, especially in a big city,
where information about traffic flows, one-way streets etc
can be important parameters to find a smart route. Also in

15 other areas, support is needed to find the most suitable
route.

When a traveller is in a place which is not well known,
he/she needs to be informed about establishments that
he/she needs to visit, such as department stores, shopping

20 centres, restaurants, public authorities and organisations.
He/she also needs information about these establishments in
order to get answer to questions of the type:

25 *   where is a do-it-yourself store that is selling goods
      of a certain make ?;

*   which are the opening hours of the municipal executive
      office ?;

30

*   where is the closest opened petrol station ?;

*   etc

35 An activity based on business, need to market its services.
To many activities, such as restaurants, hotels and places

of entertainment, travellers are an important target group.
It is today difficult to distribute information about one's
offerings to persons that just are arriving into a city.
Advertisements in newpapers and telephone directory, or
5   advertising pillars and display advertising, give a limited
possibility to inform recently arrived travellers.

Advertising with fixed texts that will reach a large group
of persons, for instance by advertisements, leaflets,
10   signboards etc is a blunt way of distributing information.
The same information is distributed to everybody,
irrespective of needs and wishes. This is cumbersome both
to those who want to distribute information, and to those
who have to acquaint themselves with it. By directing the
15   information, less amounts of information can be
distributed, which results in that the receiver need not
have to acquaint themselves with large amounts of
uninteresting information. It will be much easier to get
just that information one is needing. At the same time the
20   cost to distribute the information will be limited by the
amount of information to be exposed being smaller, but
above all the "advertiser" will experience that the
advertising will be considerably more efficient and in a
better way lead the customers and clients right.

25

TECHNICAL SOLUTION

The invention that is described in this patent application,
30   relates to a user-adapted, position-dependent, mobile
information service, where the information is uniquely
adapted to both the user's position and according to
specific wishes regarding content of information. This is
achieved by a combination of www-technology, especially
35   developed client software in Java, especially developed
software for service logic and software and technical

solution to distribute DGPS-data via the IP-protocol over
Internet.

The user starts up the client program in his/her terminal,
at which a map over the local surrounding is loaded down to
the client. On the map is shown the user's position,
corrected by means of a position correction function, for
instance DGPS, which is also transmitted to the client over
the data network. To this there is an information base
connected with geographically coded (geo coded) information
objects, which are shown as icons on the map. These
information objects are shown by means of a browser, either
automatically or after clicking with the mouse on the icon.
The way of displaying can for instance be dependent on how
far from these virtual objects the user is. Examples of
information objects can be restaurants, road works,
navigation information, cash dispensers, department stores,
things worth seeing, and traffic interchanges etc.

The user sees the information in a window divided into two
parts on the screen. One of the windows shows a map over
the area where he/she is. On the map are shown icons, which
indicate the information objects. If one clicks on an icon,
information about the corresponding object is shown on the
other window, for instance the menu of the day for a nearby
restaurant. Alternatively, the information can be shown
automatically when the user (actually the terminal) is
approaching the restaurant.

A technical embodiment of a system for the invention
includes terminal/client, service node in the capacity of a
server, correction server for defining exactly the position
indication, reference station, map database and database
over information objects. The terminal contains positioning
system (for instance GPS) and data communication (possibly
mobile), and processor capacity to handle a browser. The

database over information objects consists of a database with position coded information.

5 ADVANTAGES

The invention describes a mobile information service that gives a user access to tailored and position-adapted information, irrespective of where he/she is. The only
10 things needed are an ordinary personal computer, a mobile telephone and a GPS-receiver of standard type.

The user sets up a personal profile where he/she selects which information that shall be shown, so that it is
15 adapted according to need and wishes. It can be anything from position adapted advertisement to traffic information (warning for elk trails, traffic accidents, roads in a bad state etc).

20 The invention gives possibility to manufacturers, public authorities and organisations to distribute advertisements and other information. The advertisement can be adapted to the user´s special profile.

25 Users can get access to the information service by subscription, and as an extension subscription the user can obtain possibility to get access to specific information. Alternatively, access to certain parts of the service can be obtained by separate order, or be given directly without
30 order.

A solution according to the invention will be of great advantage to both the person utilising the information, and the one who has information to be distributed:

35

- Only standard components are needed for the user
  equipment (telephone (for instance mobile telephone),
  GPS-receiver, ordinary (for instance portable)
  computer, and access to Internet or a corresponding
  data network).

- The service is very easy to use – load a program and
  the service is accessible.

- All included parts communicate with TCP/IP, which
  makes it easy to distribute the system. It also makes
  it easy to rescale as market and needs are changing.

- The system is fully "non-autonomous", which means that
  the user need not have map data or other information
  or program stored in his/her terminal. All necessary
  data are transmitted over the network to the user, and
  by that the user will always have access to current
  information and current maps etc.

- Operation, the maintenance and further development of
  the service are facilitated by upgrading/updating and
  other changes being necessary to make in one place
  only.

- With the information service, data from differential
  GPS (DGPS) can be distributed over Internet and there
  is no extra receiver necessary for this.

- There is a possibility to utilise only the function
  differential GPS (correction of GPS-data, DGPS), which
  gives users who have map programs and digital maps a
  possibility to, in an easy way, get corrected position
  indication.

- The client function is developed in Java, which makes it platform independent, and that it therefore (possibly with certain adaptation) can be run on mobile terminals that support Java.

LIST OF FIGURES

Figure 1 shows an overview of functional blocks and interfaces.

Figure 2 shows an overview of the parts of the system.

Figure 3 shows how map and information are displayed to the user.

EXPLANATION OF TERMS

API   Application Program Interface. Interface in an application to access underlying network services. Acts as a "glue" between different programs.

GCB   GPS Correction Block. Block for GPS-correction.

GPS   Global Positioning System.

GSM   Global System for Mobile Communication. Cellular mobile telephone system.

HTML   Hypertext Mark-up Language. The page description language for documents in World Wide Web. Comprises directions for handling of typefaces, pictures and links to other documents. It is HTML

that makes it possible to click in documents in
www and be "moved" to another document.

HTTP   Hypertext Transfer Protocol. Program language on
            Internet. The protocol that constitutes the base
            for transmission of documents in World Wide Web.

IDB   Database over information objects.

IP   Internet Protocol. Protocol that is used in
            Internet.

ISP   Internet Service Provider. Internet provider.

MDB   Map Database Block. Map database.

RS   Reference station for position correction in
            DGPS.

SB   Server Block. Block for server functions.

TCP   Transport Communication Protocol.

TEB   Terminal Equipment Block. Block for user
            equipment, terminal unit.

DETAILED DESCRIPTION

The description below refers to the figures in the enclosed
appendix of drawings.

GPS and DGPS

GPS is a system for position finding, and is functioning
all over the world. By a GPS-receiver, anyone can receive
5   satellite signals that give information about the
user's position and speed.

By GPS (Global Positioning System) the users will have
information about the position on land, at sea or in the
10 air. Satellites that are circulating round the earth
transmit radio signals that are received by GPS-receivers.
The GPS-receiver then utilises the information to calculate
position and speed.

15 GPS is built up of three main parts: Satellite part,
control part and user part.

24 GPS-satellites are circulating round the earth of which
21 are used and three are reserve satellites that are at
20 disposal if any of the regular satellites should fail. The
satellites are in different orbits at an altitude of about
20 000 km, which is a remarkable altitude for satellites.
By that, there are always at least four visible satellites,
at any place on the earth. On board the satellites there
25 are also, in addition to control and radio equipment,
atomic clocks, which attend to that the time information
that is transmitted is as accurate as possible.

The control part includes six control stations on the
30 earth. These are utilised to detect errors, disturbances
and above all to give basic data for correction of
transmitted time information.

The user part consists of a GPS-receiver, which can be
35 compared to an ordinary radio receiver with a computer and
a clock.

The GPS-satellites transmit radio signals that contain
information about

- identity of the satellite (satellite ID),

- the condition of the satellite (undamaged/damaged)

- the accurate position of the satellite

- the point of time when the signal has been transmitted

The signals are received by the user's receiver, which, by
means of information from a multiple of different
satellites, can calculate the distance to the satellites.
With three satellites one will have two possible positions,
only one of which being on the surface of the earth.
Normally, there consequently are needed three satellites to
make it possible for the receiver to give an unambiguous
position indication. A fourth satellite is used to make it
possible for the receiver to calculate the error in its
built in clock and compensate for it. This is of outmost
importance since even small errors can have fatal
consequences for the position indication by the fact that
the transmission time of the signals from the satellite is
included in the calculation of the position.

DGPS, or differential GPS, has been developed in order to
improve the accuracy at position indication. This can be
achieved by utilising reference stations with accurately
defined positions. The reference stations compare its known
position with the position that is indicated by GPS-
receiver at the station in order to calculate the error in
the satellite signals. If the error exceeds a certain
tolerance level, a correction signal is transmitted that is
utilised by the DGPS-receivers in the area.

PREFERRED EMBODIMENT

The in the present invention described personal information
service is built up as a client/server solution in a
multiple of layers. To each server (20), a multiple of
clients (21) can be connected, which results in that the
system will be scalable. To the server the clients connect
themselves, and all communication is going through this
server.

The server in its turn is connected to a map database (22)
and a database (23) containing current correction data.
These correction data are updated continuously by the
reference stations (24) that are connected. Further, there
is an information database (26) with information that shall
be shown about the different objects which have been
indicated on the map. No information from the information
service is stored in the client, but all information that
is shown is taken from the server via Internet (25). This
applies to maps as well as to the information objects that
are shown on the maps. Also correction data are transmitted
to the client via Internet. This results in that it always
is current information that is transmitted to the user, and
that the user can have varying information at different
points of time.

The information is shown in a two-section window (30,31) on
the screen of the client computer, at which one of the
windows shows a map (30) over the area where the user is.
Information that is connected to objects on the map is
shown on the other window (31). These information pages are
shown as ordinary html-pages. This makes it easy to create
information pages and that no special programs are needed.

When a client is started up, it connects itself to a server
that handles all communication with the client.

The position of the client is obtained by means of a GPS-
receiver (26). By an ordinary GPS, one will have one's
position indicated with an error of up to 100 m. This means
that one in a city cannot be sure of in which block one is.

5   By means of a correction system, such as differential GPS,
DGPS, one can achieve a better accuracy.

By building a network of reference stations one collects
reference data. These correction data are transmitted to

10 the clients that forward them the GPS-receiver. In the GPS-
receiver, the information then is utilised to create a more
accurate position indication. According to the invention,
correction data are transmitted via Internet, which results
in that not extra equipment need to be connected, and no

15 special subscription is needed for the correction.

Correction data are normally transmitted in a special
format, RTCM, which is a standard protocol that is used for
communication with GPS-receivers.

20
The functions of the information service are implemented in
Java. It is for that reason very easy to change operating
system and hardware for the different parts of the system.

25 All communication is executed by means of TCP/IP, which is
used on Internet. This means that the parts need not be at
the same physical place, and that it is easy to connect to
the server.

30 Method of application

The user is equipped with a terminal (client computer, 1)
with functionality for data communication (for instance
GSM), positioning system (for instance GPS), operating

35 system with support for WWW-browser (for instance an

ordinary portable computer) and access to Internet via a
telephone, preferably mobile telephone, for instance GSM.

Necessary software for the positioning system shall be in
5   operation at the client computer. The software can easily
be taken into operation for instance by loading via
Internet from the service provider's web-site and
subsequent installation.

10 The user sets up a fixed or mobile connection to Internet
by his/her Internet-provider (2). The client software reads
the position from the GPS-receiver (3), transmits the
position to the server block (SB, 4), which forwards the
position to position correction, GCB(5). GCB decides which
15 reference station (RS) that shall be used to correct the
user's position. About seven RS´ are necessary to cover
Sweden. Each RS handles client within a radius of 600 km.

SB registers for each user which RS that is best for the
20 user just now. If the user moves so that another RS is more
suited, the stored information about best RS is updated.

Correction data, which consist of propagation time error
for the satellite reception for each reference station, are
25 transmitted every 10th second to the client. The client
software transmits this to the GPS-receiver via a
standardised protocol (RTCM). The GPS-receiver calculates
itself its exact position by means of correction data from
RS, which gives an accuracy of about 15 m. Under favourable
30 conditions and with optimal location of reference stations,
the accuracy may be as good as 2 m.

The client software (TEB, 1) transmits the position
information to SB (4), which from the map database (6)
35 fetches right map picture in suitable picture coding
format, for instance GIF-format, and transmits it to the

client. The client software continuously indicates the
user's position on the map (once/second). Correction of the
position is normally made every 10th second, but the
interval can, when necessary, be adjusted to shorter or
5   longer value. If GCB functions, and succeeds in
transmitting correct correction information, the indication
is green. If the correction cannot be made, the position is
only indicated by means of the interpretation of position
of the GPS-receiver (± 100 m), at which the indication
10   becomes yellow. If reception of GPS-data is lacking
completely, the indication will be red.

When the user reaches the edge of the picture of the map,
the client transmits a new corrected position to SB, which
15   arranges to transmit next picture of the map, on which the
user's position then is indicated.

To SB there also is a database over information objects
(IDB) connected. In the database there are information
20   objects that are geographically encoded. Each time the
client software requests a new map, SB checks the content
in IDB and encloses information about which objects that
shall be presented, and where on the picture of the map
they shall be shown. The client software presents the icons
25   for these objects on the picture of the map. The icons are
in HTML-format and are collected by means of the http-
protocol. This means that they can be anywhere in the
network, and can be owned by anyone (for instance a
restaurant, cash dispensers or the like). The icons can "be
30   clicked" and refer to a web page on Internet. The content
of the page, which is in HTML-format, is fetched by the
httl-protocol. The web page, which the icon refers to, is
shown on a window beside the map.

35   The client software also can be set to automatically fetch
a certain web page when one is coming within a certain

distance from the object on the map. This means, for
instance, that if one is driving a car and has set the
client software to automatically show certain objects, one
will automatically have information when one is approaching
5   a place. In that way one will in good time be informed
about when one is approaching a fork in the road, or a
place one intends to visit.

10 TECHNICAL STRUCTURE

The invention can be described in four processes. The
processes are realised by four functional blocks and three
software interfaces (APIs) between these functional blocks.
15

Processes

The first process receives and corrects the position from
the GPR of the terminal unit, and shows the position
20 information on the terminal unit. This is performed in a
continuous process.

In the second process, a new map is transferred to TEB. The
process is activated when the map in TEB is of no interest
25 any longer, or in another way unusable.

In the third process a position is received from the GPS of
the reference station. Based on this received position
information, a calculation is made of necessary correction,
30 which is transferred to GCB. This is performed in a
continuous process.

The fourth process includes transmission of the position
correction to TEB. The interval for transmission is
35 specified by TEB. This is performed in a continuous
process.

Functional blocks

The server block (SB, 4) is the central unit from which the
terminal units (TEB, 1) update their information. All
communication between the functional blocks is going via SB
routed through SB. The traffic is going via the following
interfaces:

- API SB-TEB-   for communication with TEB

- API SB-GCB-   for communication with GCB

- API SB-MDB-   for communication with MDB

The block for the terminal units (TEB) constitutes the
user´s man/machine system. Input and output data are
transmitted to/from the user via the block. Connection to
SB is made by the TCP/IP-protocol over GSM via the
interface SB-TEB. A GPS-receiver (3) is connected to TEB to
receive the position of the terminal unit.

The block for GPS-correction (GCB, 5) collects and provides
the system with information about position correction from
external units. GCB can handle a plurality of external
units. Each unit receives the position information from a
GPS-receiver (10) and calculates the position correction by
knowledge of the real position. The block communicates with
SB over the interface SB-GCB.

The block with map database (MDB, 6) contains the database.
The maps are transmitted to SB based on information about
position, scale and size. The communication with SB is made
over the interface SB-MDB (9).

SCENARIOS

The traveller

5   As traveller in foreign places one often needs to use a map
     to find one's way. One also needs further information to
     find certain types of stores and places, for instance,
     restaurants, bus stops and things worth seeing. The
     traveller will have a current map over the area where
10   he/she is, and information especially adapted according to
     the needs, for instance menu of the nearest restaurant, or
     the opening times for things worth seeing. The traveller
     also can have a description of roads to places to which
     he/she doesn't know the route. On the web-page there may
15   also be links to further information such as description of
     the things worth seeing and references to other objects.

The seafarer

20   At sea it gives safety to have a good and current nautical
     chart over the area where one is sailing. A local sea
     weather forecast may also be important to have access to.
     This information can be received directly in the boat.
     Since the information is not stored in the client, but is
25   fetched from Internet, it is always current. The seafarer
     never need to bother himself/herself about whether the
     nautical chart is obsolete or not. In addition to all
     ordinary information that is shown on the nautical chart,
     there also is information about where one can buy
30   provisions. The ports even can receive an order for
     provisions before one arrives there.

Firm of haulage

35   A firm of haulage can get an order to deliver goods to
     different places that can be difficult to find even for

persons who know the district/locality well. It may be
worth a lot to, in an easy way, indicate the customer's
address and then receive a description of the route. For
the firm of haulage it is important to deliver the goods
5   fast, and then it is important to avoid traffic problems.
Together with the description of the route, which is shown
on the screen of the client computer, also information
about traffic problems, if any, are shown. The route
description can take this into account and show how traffic
10 problems can be avoided.

The firm of haulage also can have an survey of the position
of all trucks in order to in that way make it possible to
plan the transports so that the trucks are utilised in the
15 best possible way. Such a planning results in shorter and
faster transports, which is an advantage to both the
customers and all other traffic.

Road information

20

If the client computer is integrated with the car, and the
screen is placed in the instrumentation of the car so that
the driver can have a view of the shown information, the
road safety can be increased. By including road signs as
25 icons on the map, the icon as such, even without additional
database information, can give an enhancement of the road
and traffic information. The effect of road signs and other
information such as signposts, marking of roads etc is
further enhanced if information is also shown in the
30 database window when the car is approaching the signpost.

Since the picture of the map and the database can be
continuously updated, it is in this way also possible that
police and the authority that are responsible for the road
35 utilises this means to distribute urgent information about
road conditions, traffic accidents, or other conditions

that influence accessibility and risks. There also is a
possibility to apply icons that are invisible on the
picture of the map, but which refer to the database
information that is shown on the database window when the
5   car is approaching the place. In that way one can
distribute information to those who are passing an area,
without needing to distribute information about an event to
a wider circle.

10

FURTHER FUNCTIONS

Individual profiles

15   The user himself/herself can create individual profiles for
the type of information that he/she wants to see on the
map.

The scale of the map

20

The scale of the map is changed so that the user can have a
survey over areas, but also see details in the
neighbourhood of his/her position.

25   Footprints

The user has possibility to make "footprints", that is
creating own information objects, which other users have
possibility to see, for instance set a warning for elks.

30

Fleet management

A user can see where other users are. For instance a parent
sees where his/her children is, or a taxi service sees
35   where all the taxi-cabs are, and can send the nearest taxi
to a customer.

<u>Gula sidorna</u> ("The yellow pages")

The user can make a search in different databases, for
instance "the yellow pages", and have the result shown on a
5   map, together with a route description.

<u>Alternative positioning (position appointment)</u>

The user can request showing of a map over another area
10 than where he/she is. By indicating wanted position the
user can have a picture of a map with possibility to
appoint interesting objects in order to make it possible to
plan a journey, or to make preparations, such as to make an
order before a visit.
15

The invention is not limited to the above-described
embodiments, but may in additions be subject to
modifications within the frame of the following patent
20 claims and the idea of invention.

PATENT CLAIMS

1.   A system, for showing, on terminal equipment, user
      adapted position dependent information
      c h a r a c t e r i s e d in that communication is
      made over an open data network.

2.   A system, as claimed in patent claim 1,
      c h a r a c t e r i s e d in that said open data
      network is Internet or other data network that
      utilises the IP-protocol.

3.   A system, as claimed in patent claim 1, or 2,
      c h a r a c t e r i s e d in that the terminal
      equipment includes computer with communication
      possibility, device for appointing of position, and
      display system, for instance screen.

4.   A system, as claimed in any of the previous patent
      claims, c h a r a c t e r i s e d in that:

      •   said computer is a portable computer

      •   that communication is made via cellular mobile
           telecommunications system.

5.   A system, as claimed in any of the previous patent
      claims, c h a r a c t e r i s e d in that:

      •   the positioning system utilises GPS

      •   the accuracy of the positioning system is
           improved by means of differential GPS

6.   A system, as claimed in patent claim 5,

c h a r a c t e r i s e d in that data, which have been
created for differential GPS (DGPS), by means of basic data
from a network of reference stations, are distributed over
Internet, so there is no extra receiver needed for this.

7.   A system, as claimed in any of the previous patent
claims, c h a r a c t e r i s e d in that the error in the
position information of the positioning system is less than
20 m.

8.   A system, as claimed in any of the previous patent
claims, c h a r a c t e r i s e d in that position
information can be indicated by the user.

9.   A system, as claimed in any of the patent
claims 3 to 8, c h a r a c t e r i s e d in that the
information is shown in two views, one of which shows a map
over the area around said appointed position, with said
appointed position marked, and that information about
selected objects are shown in the other view.

10.   A system, as claimed in patent claim 9,
c h a r a c t e r i s e d in that the views are shown in
separate windows on the display unit of the terminal
equipment.

11.   A system, as claimed in the patent claim 9 or 10,
c h a r a c t e r i s e d in that objects, for which
further information can be shown, are identified on said
map, and that said information is shown on the terminal
equipment after marking with pick device.

12.   A system as claimed in patent claim 11,
c h a r a c t e r i s e d in that said identification of
object is made by icons, and that said icons and said

information, which is shown, can be anywhere in the
network, and be owned by anybody.

13. A system, as claimed in patent claim 12,
c h a r a c t e r i s e d in that said icons and said
information that is shown are written in the HTML-language
and are fetched by the HTTP-protocol.

14. A system, as claimed in any of the patent claims 9 to
13, c h a r a c t e r i s e d in that, when the
geographical distance between said appointed position and
an object, for which further information can be shown, is
less than a predefined value, information regarding said
object is shown on the terminal equipment.

15. A system, as claimed in any of the patent claims 9 to
14, c h a r a c t e r i s e d in that the client software
continuously updates said appointed position.

16. A system, as claimed in any of the patent claims 3 to
15, c h a r a c t e r i s e d in a combination of www-
technology, platform independent client software, software
for service logic, and software and technical solution to
distribute data for position correction via the IP-protocol
over Internet.

17. A system, as claimed in any of the previous patent
claims, c h a r a c t e r i s e d in that client software
is written in Java.

18. A system, as claimed in any of the previous patent
claims, c h a r a c t e r i s e d in that the user can set
up a personal profile over which information that shall be
shown.

19. A system as claimed in any of the previous patent

claims, c h a r a c t e r i s e d in that all included
units communicate by TCP/IP.

20. A system, as claimed in any of the previous patent
claims, c h a r a c t e r i s e d in that changes and other
measures for operation, the maintenance and further
development of the service only need to be made in one
place.

21. A system, as claimed in any of the previous patent
claims, c h a r a c t e r i s e d in that necessary data
are transmitted over the network to the user terminal,
which means that neither map data, nor other information,
are stored in the terminal equipment.

22. A system, as claimed in any of the previous patent
claims, c h a r a c t e r i s e d in a client/server
solution in several layers where a multiple of clients (21)
can be connected to each server (20), to make the system
scalable, and where all communication is going via the
server.

23. A system, as claimed in patent claim 22,
c h a r a c t e r i s e d in that the server is connected
to a map database (22), a database (23) containing current
data for position correction, and information database (26)
with information that shall be shown about objects.

24. A system, as claimed in patent claim 23,
c h a r a c t e r i s e d in that information objects in
said information database are geographically encoded, and
that each time a new map is transmitted to terminal
equipment, information is enclosed about which objects that
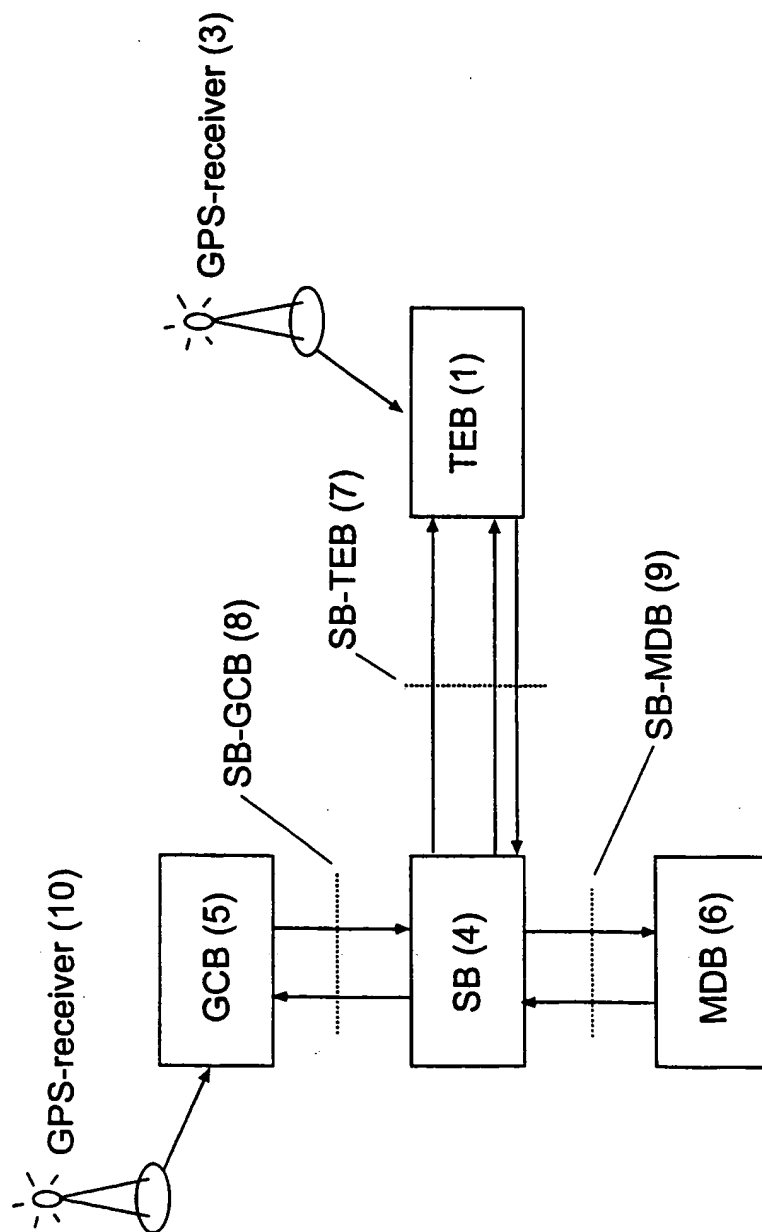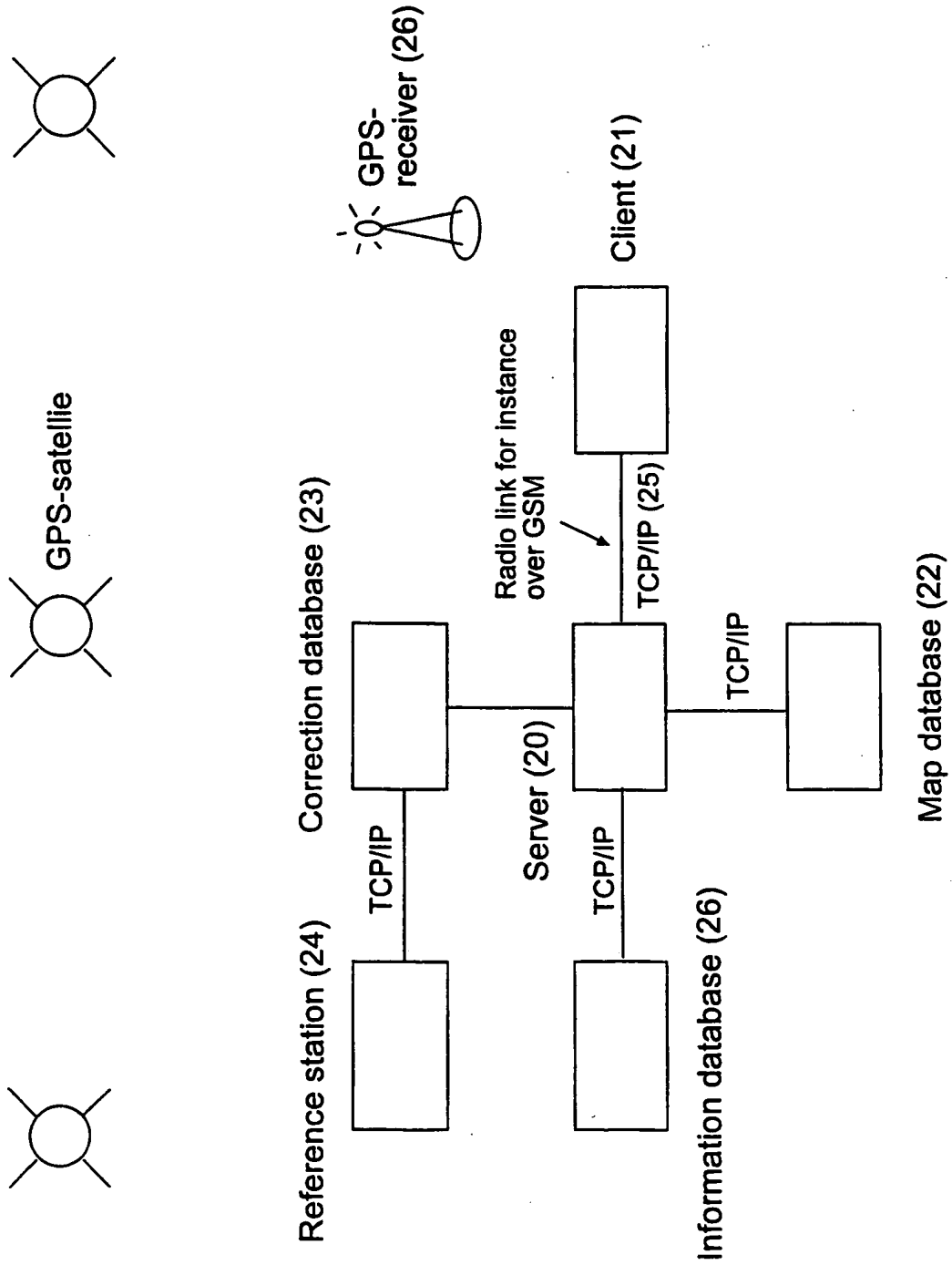shall be shown, and where on the picture of the map they
shall be shown.

Figure 1

GPS-satellie
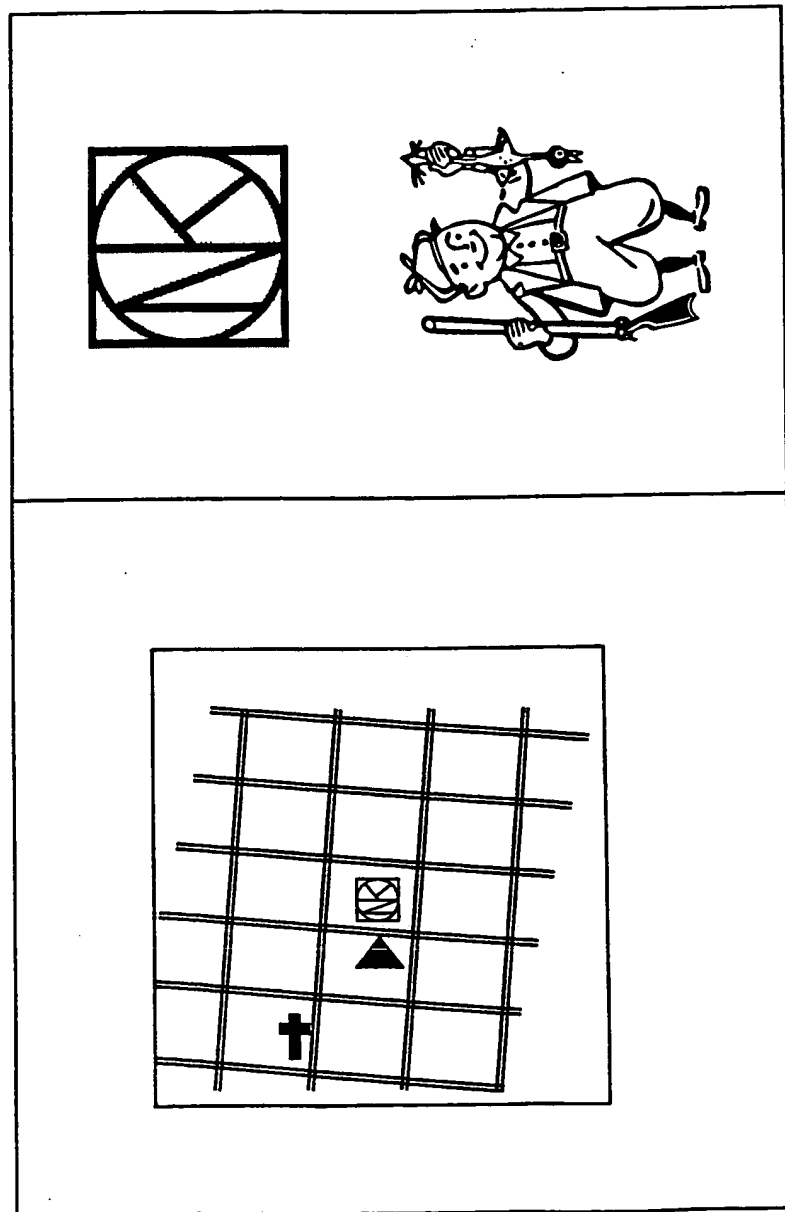
GPS-
receiver (26)

Client (21)

Correction database (23)

Reference station (24)

TCP/IP

Server (20)

TCP/IP

Radio link for instance
over GSM

TCP/IP (25)

TCP/IP

Information database (26)

Map database (22)

Figure 2

(31)

(30)

Figure 3

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G06F 17/30, G08G 1/0967

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G01C, G01S, G06F, G08G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9707467 A1 (PHELAN,SEAN), 27 February 1997 (27.02.97)	1-4,8-13, 15-17,19-22
Y		5-7,14,18, 23-24
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Y	PATENT ABSTRACT OF JAPAN,abstract of JP-09311177 A (SEIKO EPSON CORP), 1997-12-02	5-7,23-24
	--	
Y	DE 19626114 A1 (ALCATEL SEL AG), 2 January 1998 (02.01.98), figure 1, abstract	14
	--	

[X] Further documents are listed in the continuation of Box C.   [X] See patent family annex.

*	Special categories of cited documents	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance		
"E"	earlier document but published on or after the international filing date	"X"	document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 May 2000	20 -06- 2000
Name and mailing address of the ISA/ **Swedish Patent Office** Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Göran Magnusson /itw Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 9808314 A1 (GINIGER,MICHAEL), 26 February 1998 (26.02.98), page 26, line 33 - page 28, line 2, abstract	18
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X	EP 0829704 A2 (HITACHI,LTD.), 18 March 1998 (18.03.98), see the whole document	1-4,8-13, 15-22
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X	IEICE TRANS.COMMUN., Volume e80-b, No 10, October 1997, N.FUJINO et al, "MOBILE INFORMATION SERVICE BASED ON MULTI-AGENT ARCHITECTURE", page 1401 - page 1405, figures 5,6	1-3,9,11-13, 16-17,19-21
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INTERNATIONAL SEARCH REPORT

02/12/99

International application No.

PCT/SE 00/00306

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DE 19626114 A1	02/01/98	EP 0817151 A		07/01/98
WO 9808314 A1	26/02/98	NONE		
EP 0829704 A2	18/03/98	JP 10089976 A		10/04/98